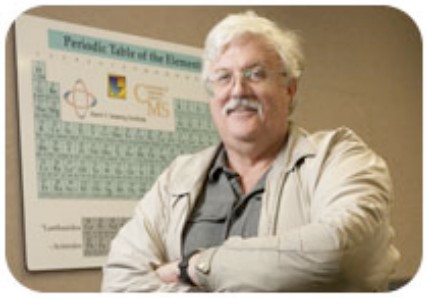
LIVERMORE LAB
REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, Oct. 32-Nov. 4, 2011.

Science IN THE MOOD



Ken Moody

The Lab's Ken Moody is changing the periodic table one element at a time.

On his way to locating the island of stability, a theorized place on the periodic table where elements will be stable and last long enough for chemical tests, Moody has been a key member of the team of scientists that have discovered six new elements -- 113, 114, 115, 116, 117 and 118.

When Moody memorized the periodic table in high school, there were only 104 elements. He never imagined at the time that there were any more to be found.

But 40 years later Moody is helping add new elements to the periodic table. He works with large international teams to push the limits of where the periodic table might eventually end.

To read more, go to *Science*.

KCBS ALL NEWS 740 AM SUPERCOMPUTERS AND BEYOND

At quadrillions of operations per second, the Lab's high performance supercomputers can speed up development in any field.

"It allows you to go to the innovation cycle faster, more effectively and at a lower cost," Tomas Diaz de la Rubia, LLNL's deputy director for Science and Technology, said in a recent KCBS radio interview.

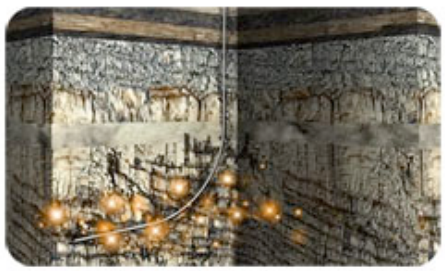
The Laboratory has issued a call to energy businesses for proposals to collaborate with LLNL teams of experts in advancing energy technology through the use of high performance computing (HPC).

This one-year pilot program, called the hpc4energy incubator, aims to accelerate the development of energy technology and boost U.S. competitiveness in the global marketplace by teaming industry with the scientific and computing resources at national laboratories.

"It's an ecosystem of teams of people and computer hardware that can come together to try to accelerate innovation in the energy sector," Diaz de la Rubia said.

To hear the full interview, go to KCBS radio.

UPI.com OVER 100 YEARS OF JOURNALISTIC EXCELLENCE FRACKING UP



Hydraulic fracturing, or fracking, involves drilling deep into the earth and injecting a high pressure mix of water, sand and chemicals to fracture shale rock to release pockets of trapped gas and oil. (image: electrictreehouse.com)

Using underground explosions to coax gas out of shale doesn't use possibly toxic water, but the idea is "immature," a Laboratory scientist said recently.

Energy companies use hydraulic fracturing, or fracking, to draw natural gas out of shale formations. The chemicals used in fracking fluid have raised concerns because of possible water contamination.

Julio Friedmann, head of the carbon management program at the Laboratory, said that if companies "blow up a lot of rocks" using explosive material, they may be able to get gas out of shale without using fracking fluid.

"Water use is big and it complicates things," he said.

He said the environmental impact of using underground explosives is "benign" and uses "almost no water" but added the idea was still in the infant stage.

To read more, go to UPI.

ClimateWire LOOK UP IN THE SKY

For scientists, clouds are difficult to track as they move, blend and shift in the sky, making it hard to understand their effects on a global scale.

But Laboratory researchers along with an international team have developed a tool that helps climatologists bridge the gap between how clouds show up in satellite data and how they are represented in climate models, creating better predictors of climate changes to come.

Clouds play an important role in climate, since they absorb and reflect solar radiation but also retain heat like greenhouse gases. Their effects vary depending on their density, altitude, composition and temperature -- all factors that can be modeled.

Assessing how accurate these models are requires comparisons to actual climate measurements and observations, usually from satellites, according to Stephen Klein, a research scientist at the Program for Climate Model Diagnosis and Intercomparison at the Lab.

To read more, go to *Climate Wire*.

Science ONE STEP CLOSER

Inside the NIF target chamber.

Lab physicists are seeking the most direct path to creating a star on Earth, at the National Ignition Facility.

Their goal is to create fusion, the same energy that powers the sun and stars. Ignition is the moment when a pulse of light from NIF's 192 laser beams heats a target containing a tiny capsule of fusion fuel and causes it to implode. The fuel heats enough so that a large fraction of its nuclei fuse together and release a burst of energy larger than the energy of the light pulse that crated it.

Though fusion isn't expected until 2012, scientists have already begun other research. For example, some have been simulating what goes on in a supernova explosion, while others are gauging the equation of state of materials at the heart of a giant planet. Meanwhile, nuclear weapons researchers have used NIF's lasers to verify their computer models of nuclear explosion.

To read more, go to *Science*.

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

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